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I want to keep on exercising but I don't: The negative impact of momentary lacks of self-control on exercise adherence

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ABSTRACT

Objectives: We investigated the impact of state and trait self-control strength on exercise execution. We hypothesized that state self-control strength is reduced on days that are perceived as stressful and that reductions in self-control strength result in a lower likelihood to work out. Additionally, trait self-control strength may affect the execution of workout plans.
Design: University students, who stated that they have not been exercising regularly for at least one month, filled in a trait self-control inventory, a personality questionnaire, and were instructed to perform a daily workout over a one-week period. Perceived stress levels, state self-control strength, and workout completion were assessed on a daily basis.
Results: Results revealed that people were less likely to exercise on days they perceived as stressful. State self-control mediated the relation between stress and exercise completion. Trait self-control and other personality variables did not affect workout completion.
Conclusions: Results indicate that daily stress is associated with self-control depletion and a lower likelihood to work out.

1. Introduction

Regular physical activity can be beneficial for one's health and subjective well-being (e.g., Biddle & Mutrie, 2007; Ströhle, 2009) and is associated with better mental health, lower levels of stress, and lower levels of anxiety (e.g., Bhui & Fletcher, 2000; Goodwin, 2003). Most medical rehabilitation programs include some sort of physical activity (e.g., Dunn, Trivedi, & O'Neal, 2001). On the contrary, a sedentary lifestyle is associated with negative consequences, such as overweight, obesity, type-2 diabetes mellitus, and cardiovascular diseases (e.g., Hamilton, Healy, Dunstan, Zderic, & Owen, 2008). The World Health Organization's (WHO) criteria for a healthy lifestyle include at least 150 min of moderate-intensely aerobic physical activity per week. Adults are recommended to keep their activity levels to 300 min per week for additional health benefits (WHO, 2010). However, a recent study revealed that 31% of adults worldwide are physically inactive (i.e., less than 150 min of physical activity) and that 80% of the 13-15-year-olds engage in physical activities for less than 60 min per day (Hallal et al., 2012). Furthermore, maintaining an active lifestyle over time seems to be difficult as daily hassles (i.e., stressful encounters during the day) can often interfere with the execution of workout plans. Nguyen-Michel and colleagues have shown, for instance, that higher levels of stress are associated with lower levels of physical activity (Nguyen-Michel, Unger, Hamilton, & Spruijt-Metz, 2006).

Although most individuals are aware of the positive effects of regular physical activity and have the intention to work out regularly, several studies demonstrate that there is often a gap between workout intentions and behaviour—that is, workout behaviour cannot be maintained in the longer term (e.g., Rhodes, Plotnikoff, & Courneya, 2008). Most existing traditional theoretical approaches of physical activity (e.g., Theory of Planned Behaviour; Ajzen, 1991) cannot fully explain lapses in exercise behaviour, as they primarily focus on how exercise intentions are formed (e.g., Sniehotta, Presseau, & Araújo-Soares, 2014; see also; Rebar, Loftus, & Hagger, 2015). However, especially with regard to workout plans, it is often the case that despite one's best intention, plans are not executed (Rhodes et al., 2008). This highlights the need of identifying predictors of exercise execution. Martin Ginis and Bray (2010) propose that the ability to adhere to an exercise schedule over an

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extended period of time is an act of self-control (see also Bandura, 2005). In line with this notion, more recent models of physical activity also include post-intentional self-regulatory acts of shielding intentions from distracting or tempting alternatives (e.g., relaxation instead of working out after a long day at work; cf. Gollwitzer, 1999; Schwarzer, 1992; Schwarzer & Luszczynska, 2008). In the present research, we build on a further recent theoretical approach to explain lapses in exercise behaviour: the *Strength Model of Self-Control* (Baumeister, Bratslavsky, Muraven, & Tice, 1998; see also Hagger, 2010; Hagger, Wood, Stiff, & Chatzisarantis, 2009; Martin Ginis & Bray, 2010).

1.1. The Strength Model of Self-Control

Baumeister and colleagues define self-control as the ability to inhibit or alter predominant response tendencies and to resist immediate gratifications in favour of more desirable long-term benefits (e.g., Baumeister et al., 1998). Accordingly, any self-control act (e.g., emotion regulation, attention regulation) is energized by one global metaphorical resource (e.g., Schmeichel & Baumeister, 2010). This self-control resource, however, is limited and people differ regarding their self-control capacities (i.e., trait-self-control strength; Tangney, Baumeister, & Boone, 2004). Additionally, self-control strength can also become temporarily depleted; for example, after a straining self-control act was performed (i.e., *ego depletion*; e.g., Baumeister et al., 1998). Ego depletion is assumed to negatively affect subsequent behaviour that requires self-control. This idea is supported by a recent meta-analysis showing medium to large sized ego-depletion effects (Hagger, Wood, Stiff, & Chatzisarantis, 2010).

Recent studies showed that state self-control strength may also be of central significance in the sport and exercise domain (cf. Englert & Bertrams, 2012). For instance, Dorris, Power, and Kenefick (2012) found athletes to perform fewer push-ups and fewer sit-ups in a state of ego depletion as compared to a state with fully available self-control strength. In light of such findings, it becomes apparent that states of ego depletion render it unlikely that individuals push themselves to the limit, although it would be physiologically possible. This general finding may not only be of relevance for athletes but also for individuals intending to maintain a healthy active life style. For these individuals, working out may require self-control and thus draws on limited self-control resources as one needs to inhibit predominant tendencies to relax and to instead engage in other—potentially exhausting—actions: Importantly, many individuals first have to deal with a number of different stressful events during a day, before they can even initiate their workout plans as part of their leisure activities. It has been argued that higher levels of perceived stress are associated with a higher likelihood of depleted self-control strength (cf., Tangney et al., 2004). Such a state of low self-control strength may, in turn, render a workout execution less likely (cf., Ntoumanis, 2014).

A recent study by Bertrams and Englert (2013) showing that participants with lower levels of trait self-control strength were less likely to meet their physical-activity standards provides first empirical support for this assumption. Additionally, Stork and colleagues found out that self-reported as well as objectively measured trait self-control strength significantly predicted exercise behaviour over a 4-week period (Stork, Graham, Bray, & Martin Ginis, 2016). Based on these findings, we assume that individuals with lower trait self-control strength will be less likely to be physically active. However, self-control strength does not only vary between individuals but also within individuals between situations (e.g., Tangney et al., 2004). That is, there is a situational (i.e., state) and a dispositional (i.e., trait) component of self-control strength and both components may explain parts of the variance in the execution of workout intentions (cf., Baumeister et al., 1998; Tangney et al., 2004). As the former component lies more under personal control, it is important to know whether it affects the execution of workout acts that may come with health benefits in the long run, but are exhausting in the short run. A study by Martin Ginis and Bray (2010) provides first indications that state self-control strength plays a role in the execution of workout plans. In this study, the authors found that prior self-control exertion lead to decreases in the intended effort to engage in future exercise, and was associated with a lower likelihood of adhering to exercise plans. Therefore, we were interested in whether state self-control strength would predict whether an individual executes his/her workout schedule on a given day or not. Furthermore, we investigated whether trait self-control strength explains variance in workout execution over-and-above state self-control strength and whether inter-individual differences in trait self-control strength influence the relationship between state self-control strength and workout execution (for a discussion on the role of trait and state self-control strength, see also Hofmann, Baumeister, Förster, & Vohs, 2012).

Further, to gain a better understanding of why self-control is sometimes situationally reduced, we also assessed how stressed individuals perceived their day. As dealing with stressful events requires self-control, state self-control strength should be reduced after stressful episodes (e.g., Tangney et al., 2004). Accordingly, we predicted a mediation model that stressful events should temporarily deplete state self-control strength and that this depletion should, in turn, render workout execution less likely (see Fig. 1, for an illustration). Finally, we also considered inter-individual differences in social desirability, self-efficacy, and global personality dimensions as potential predictors, because these personality variables have been shown to influence workout behaviour in other studies (e.g., Bandura, 2005; Conner, Rodgers, & Murrey, 2007).

2. Method

2.1. Participants

According to the WHO (2010; see also above) at least 150 min of moderate-intensely aerobic physical activity per week are recommended for a healthy lifestyle, while 300 min per week are considered beneficial for additional health benefits. We therefore aimed to only include participants in our final sample whose self-reported physical activity was currently below 300 min per week and who should thus gain additional health benefits from additional exercising. Furthermore, we only included participants that have not been exercising regularly for the last month and who explicitly stated that they wanted to be more physically active. To identify the individuals of interest, potential participants were first invited to take part in an activity-level screening via mailing lists and adverts. A total of 449 participants were screened; most of them were students of or worked at Heidelberg University. Of this sample, 107 persons matched the criteria outlined above and were thus invited to participate in the study. From this sample, 62 individuals agreed to further participate in the present study. Demographic information and information regarding the activity status of the sample is provided in Table 1.

Participants received a monetary compensation of up to 40 Euros depending on their compliance. The study was carried out in accordance with the Helsinki Declaration of 1975 and we collected written informed consent from each participant.

2.2. Procedure

Individuals who were physically active for less than 300 min per